BSI

BS 2782 : Part 8 : Methods 823A and 823B : 1978

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British Standard Methods of testing

Plastics

Part 8. Other properties

Methods 823A and 823B. Methods for the assessment of carbon black dispersion in polyethylene using a microscope

Méthodes d'essai des matières plastiques
Partie 8. Autres caractéristiques
Méthodes 823A et 823B. Evaluation de la dispersion du noir de fumée dans le polyéthylène au moyen d'un microscope

Prüfverfahren für Kunststoffe
Teil 8. Andere Eigenschaften
Verfahren 823A und 823B. Bewertung der Rußverteilung in Polyäthylen mittels eines Mikroskopes

IMPORTANT NOTE. Before reading this method it is essential to read the foreword, general introduction and instructions to BS 2782, issued separately.

0. Introduction

These methods describe procedures for assessing the uniformity of the dispersion of carbon black in a compound, extrusion or moulded article.

They replace methods 510A and 510B of BS 2782 : 1970 which are being withdrawn.

Warning note. These methods do not necessarily detail all the precautions necessary to meet the requirements of the Health and Safety at Work etc. Act 1974. Attention should be paid to any appropriate safety precautions, and the methods should only be operated by trained personnel.

1. Scope

These methods describe procedures for assessing the carbon black dispersion in polyethylene using a microscope.

Method 823A is primarily intended for use with polyethylene compounds but may be used for extrusions and mouldings if so specified.

Method 823B is intended for use with polyethylene extrusions or mouldings only.

2. Principle

Method 823A. A small sample of the material is squeezed into a thin layer 20 µm to 30 µm thick between two microscope slides heated to either 170 °C to 210 °C or a higher temperature if specified in the material specification.

The appearance of the layer is then examined by transmitted light at a magnification of ×100 against standard photomicrographs.

Method 823B. A microtome section of the material, 10 µm to 20 µm thick, is examined as for Method 823A.

3. Apparatus

The following apparatus is required.

3.1 *Hotplate*, capable of being controlled at the required temperature.

3.2 *Microscope slides.*

3.3 *Microscope* capable of at least ×100 linear magnification and a circular field of view of 0.7 ± 0.07 mm diameter.

3.4 *Microtome.*

4. Procedure

4.1 Method 823A. Place two of the clean microscope slides on the hotplate maintained at 170 °C to 210 °C or other higher temperature, as specified in the material specification. Choose six separate granules of compound, or six separate parts of a moulded or extruded article, to be as representative as possible of the whole batch. Cut a specimen of approximate mass 0.2 mg from the interior of each granule or part. Place the six specimens on one of the hot microscope slides so that each one is approximately equidistant from its neighbour(s) and from adjacent edge(s) of the slide.

Place the second slide over the first, and press the specimens out by applying even pressure for 1 min to 2 min to the whole area of the face of the upper slide. Exert an amount of pressure for a period necessary for each specimen to be pressed out to a thickness of between 20 µm and 30 µm.

NOTE. Shims of metal or some other suitable material may be used to achieve the required specimen thickness and uniformity of thickness.

After the specimens have been placed on the slide, the latter shall in no case remain on the hotplate for more than 3 min.

Remove the slide from the hotplate and when it is cool enough to be handled, examine the six specimens in turn through the microscope at a linear magnification of x100 ± 10 and with a circular field of view of 0.7 ± 0.07 mm diameter using any suitable means to ensure that the correct field of view is obtained. Scan the whole of each specimen and compare the worst field of view of each with the standard photomicrographs numbered 1 to 7 (1 best; 7 worst) in figure 1. Make the comparison with respect to the number and size of agglomerates, taking into consideration all black particles in the field of view. Assign to each of the six specimens a numerical rating corresponding to the number of the photomicrograph equivalent to the worst field of view of each specimen.

Examine the six pressed specimens for uniformity of appearance with respect to smears and streaks. Compare the worst field of view for each specimen with photomicrograph A of figure 1. Note whether the specimen is better or worse than this photomicrograph.

4.2 Method 823B. Cut six microtome sections of thickness between 10 μm and 20 μm and approximately 7.0 mm^2 area from different parts of the extrusion or moulding.

Place the sections on one of the microscope slides, spaced as described in **4.1**, and cover with a cover slide.

NOTE. It may be sometimes convenient to add a small amount of castor oil to the sections in order to obtain a clearer view.

Examine the sections as described in **4.1**.

5. Expression of results

5.1 Calculate the overall rating of the material as the average of the six ratings rounded to the nearest whole number.

5.2 State how the material compares for smears and streaks with photomicrograph A of figure 1, i.e. better or worse.

6. Test report

The test report shall include the following particulars.

(a) A complete identification of the material tested, including type, source, manufacturer's code numbers and previous history.

(b) A reference to the appropriate British Standard method, e.g. BS 2782 : Method 823A : 1978.

(c) The individual ratings and overall rating for dispersibility.

(d) The result of the smear comparison.

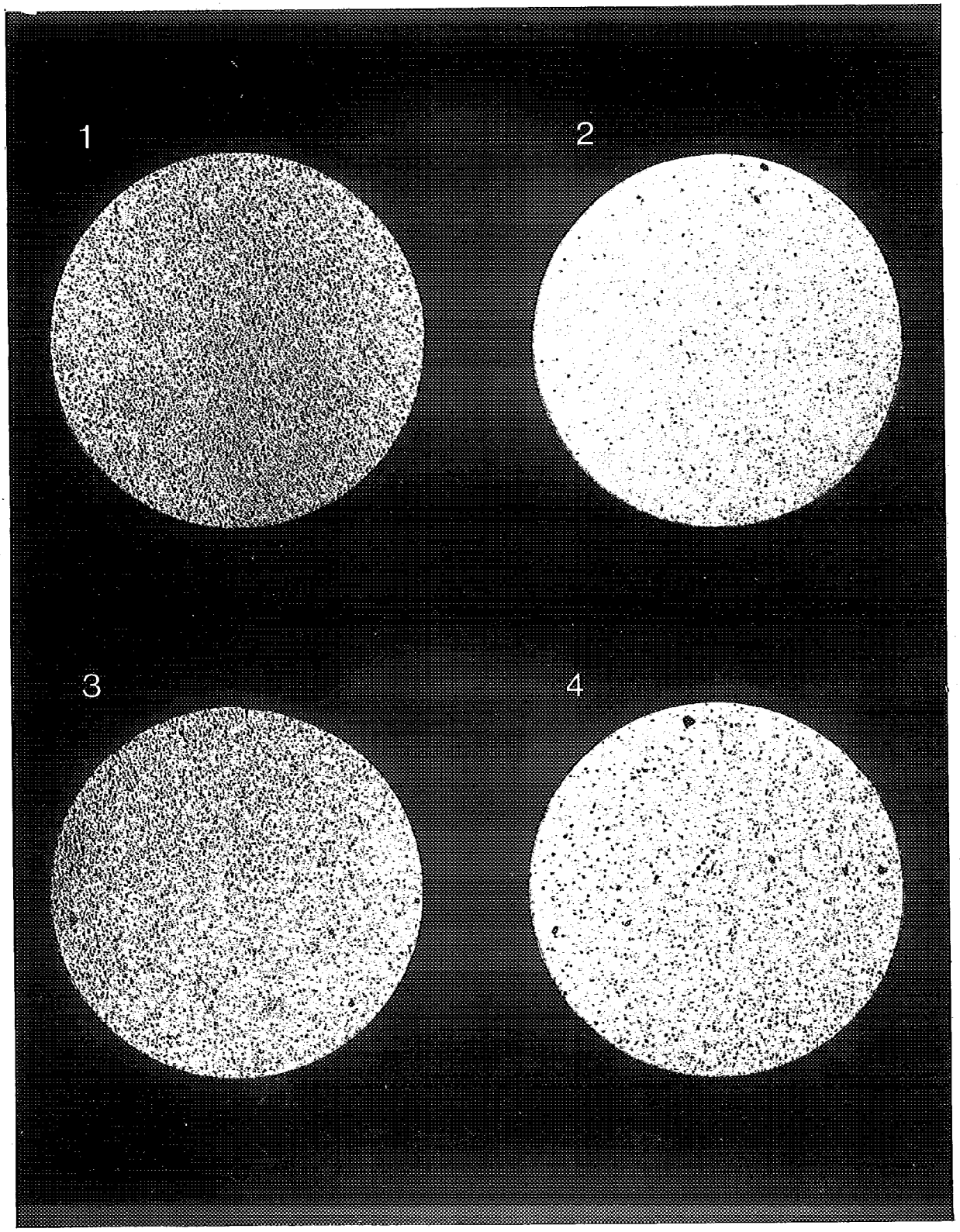

Figure 1. Photomicrographs 1 to 7 and A

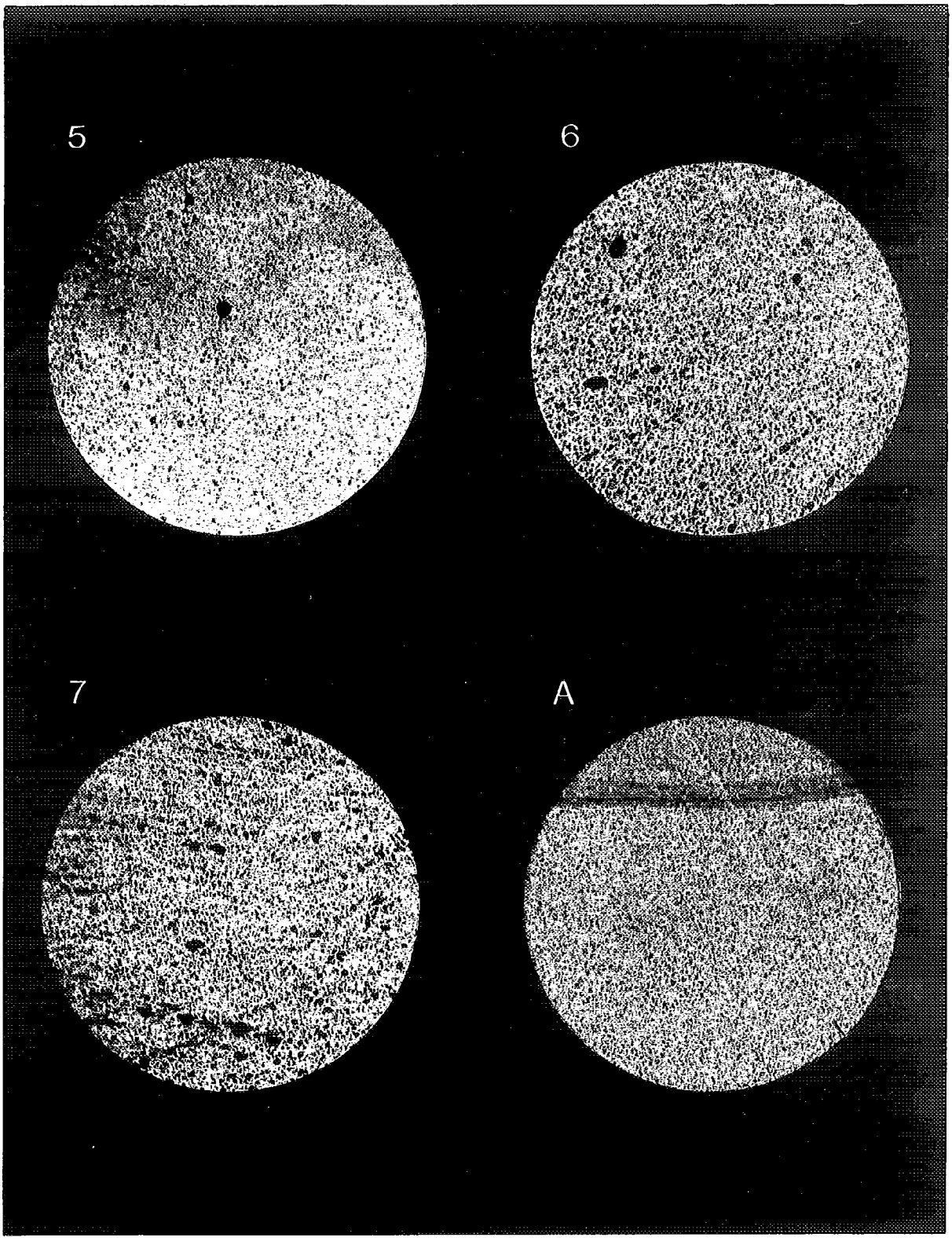

Figure 1. *(concluded)*

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